HR Analytics Dashboard

Acknowledgment:

I would like to express my gratitude for the opportunity to work on this self-assessed HR Analytics project. This report reflects my efforts to demonstrate data analysis and visualization skills. I also appreciate the availability of online resources and tools that supported my work throughout this project.

Abstract:

This report presents a self-assessed HR Analytics Dashboard designed to analyze employee attrition, performance, and compensation trends. The dashboard utilizes data visualization techniques to support data-driven decisions for workforce optimization. Key metrics, such as attrition rates, job satisfaction, salary distribution, and tenure analysis, are visualized using Power BI to highlight insights into employee retention and performance patterns.

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1: Introduction

1.1 Problem Statement

Employee attrition is a critical issue faced by organizations worldwide. High turnover rates not only result in increased recruitment and training costs but also affect productivity, morale, and the overall performance of a company. Understanding the underlying causes of employee attrition and identifying patterns in workforce behaviour is essential for organizations to develop effective retention strategies and improve employee satisfaction.

The challenge lies in analysing large volumes of employee data to uncover insights into factors such as job satisfaction, salary levels, tenure, and performance metrics that influence employee decisions to leave or stay within an organization. Traditional approaches to analysing such data often fail to provide actionable insights due to the complexity and multidimensional nature of HR data.

This project aims to address these challenges by leveraging data analytics and visualization techniques to identify trends, correlations, and patterns related to employee attrition and performance. Using an interactive Power BI dashboard, this study presents visual representations of key metrics, including attrition rates, salary distributions, tenure analysis, and job satisfaction levels.

The ultimate goal of this project is to enable HR professionals and decision-makers to make data-driven decisions that optimize workforce management, improve retention strategies, and foster a more productive and satisfied workforce.

1.2 Objectives:

The primary objective of this project is to analyze employee attrition and performance metrics using data analytics and visualization techniques. This study aims to provide actionable insights to improve workforce management and retention strategies. The specific objectives are:

1.2.1 Analysed Attrition Patterns:

To evaluate attrition rates based on job levels, departments, tenure, and job satisfaction, identifying high-risk areas within the organization.

1.2.2 Assess Salary and Compensation Trends:

To study salary distribution, increments, and their impact on employee satisfaction and retention.

1.2.3. Identify Key Performance Indicators (KPIs):

To highlight performance metrics, such as tenure, salary hikes, and satisfaction scores, and their influence on employee stability.

1.2.4. Visualize Workforce Trends:

To create an interactive Power BI dashboard that provides clear visualizations of data insights, enabling decision-makers to identify trends and patterns effectively.

1.2.5 Support Decision-Making:

To offer data-driven recommendations for improving employee engagement, reducing attrition, and optimizing compensation structures.

1.2.6. Simplify Data Analysis:

- To demonstrate the use of Power BI as a tool for simplifying complex data analysis and enhancing HR analytics capabilities.
- By achieving these objectives, this project aims to empower HR teams with insights necessary for creating policies that promote employee satisfaction and retention.

1.3 Scope of the Study:
This study focuses on analysing employee attrition, performance metrics, and salary trends using HR data. It leverages Power BI for interactive visualizations to identify patterns and correlations that influence employee retention and satisfaction. The scope includes evaluating factors such as job satisfaction, salary increments, and tenure to uncover key drivers of attrition. Additionally, the study highlights performance indicators and compensation structures to support data-driven decision-making. The findings aim to provide actionable insights for improving HR policies and enhancing employee engagement strategies.

2: Literature Review

2.1 Existing Studies on HR Analytics:
Studies emphasize the importance of HR analytics in improving workforce management. Data visualization is highlighted as a key tool for simplifying complex data and supporting decisions.

2.2 Key Metrics and Frameworks:
HR analytics frameworks focus on tracking employee engagement, performance metrics, and attrition drivers. These frameworks inform the selection of metrics used in this project.

3. Methodology:

This section outlines the structured approach followed in the study to analyze employee attrition and performance metrics. The methodology involves data collection, preprocessing, analysis, and visualization to ensure accuracy and reliability of insights.

3.1 Data Collection:
Employee data was extracted from a relational database using MySQL Workbench. The dataset included key attributes such as job levels, salary details, tenure, job satisfaction, and performance metrics, providing a comprehensive view of employee profiles.

3.2 Data Preprocessing:
The collected data was cleaned and transformed using Excel to ensure consistency and eliminate errors. Missing values were handled through imputation techniques, and outliers were identified and treated to maintain data integrity. Data types were standardized to enable accurate calculations and visualizations.

3.3 Data Analysis and Visualization:
Key metrics and performance indicators were identified to evaluate patterns in attrition rates, salary distributions, and employee satisfaction. Power BI was used to create interactive visualizations, including charts and tables, to simplify the interpretation of complex data. These visualizations facilitated the identification of trends, enabling HR professionals to make data-driven decisions.

This structured methodology ensures that the study is systematic, reliable, and focused on delivering actionable insights for effective workforce management.

4: Technology Used:

This study utilized a variety of technologies and tools to facilitate data collection, analysis and visualization

1. **MySQL Workbench:**
   Used to extracting employee data from relational databases.it enables efficient data management and querying, ensuring that the dataset is structured and accessible for analysis.

2. **Excel:**
   Employed for initial data cleaning and preprocessing. excel was used for handling missing values, removing outliers and perform basic transformation to prepare the data for more advanced analysis.

3. **Power BI:**
   the primary tool for data visualization and dashboard creation. Power bi was used to design inactive and user-friendly dashboard, presenting key metrics and insights such as attrition rates, salary distribution and performance indicators. Its intuitive feature allow for dynamic filtering and in-depth analysis of HR data.

4. **DAX (Data Analysis Expression):**
   A powerful formula language used within Power BI to create custom calculations and KPIs. Enhancing the dashboard’s analytical capabilities.

These technologies worked together seamlessly to prove a robust solution for analysing employee data and visualizing key insights for decision-making.

5: Implementation

5.1 Dashboard Design:
The dashboard was meticulously structured to deliver intuitive and interactive visual insights into employee data. It features a variety of visual elements, including charts, tables, and slicers, enabling users to filter and explore specific data points with ease. The design emphasizes clarity and usability, ensuring that HR professionals can efficiently analyse key metrics, identify trends, and make data-driven decisions. Each visualization is tailored to highlight critical aspects such as attrition rates, salary distributions, and performance indicators, providing a comprehensive view of workforce dynamics.

5.2 Data Visualization

- Attrition Rate by Job Level and Department: Displays department-wise attrition patterns.
- Employee Distribution by Salary and Experience: Highlights segmentation based on salary slabs and work experience.
- Average Monthly Compensation by Department: Shows salary variations across departments.
- Attrition Rate by Job Satisfaction and Tenure: Analyzes the impact of satisfaction and tenure on attrition.

5.3 Metrics and KPIs

The metrics include attrition percentages, salary hikes, job satisfaction scores, and tenure analysis.

6: Results and Analysis

6.1 Key Insights

- Departments with low job satisfaction report higher attrition rates.
- Employees with higher salaries and longer tenure exhibit higher retention.
- Mid-level experienced employees show greater stability compared to new hires.

6.2 Trends and Patterns

- Higher attrition rates are associated with job Roles requiring lower skills.
- Salary Increments correlate positively with satisfaction and retention.

6.3 Performance Metrics

Performance metrics emphasize salary optimization and satisfaction improvement to reduce turnover.

7: Conclusion and Recommendations:

7.1 Summary of Findings:

The HR Analytics Dashboard effectively showcases the power of data visualization in analysing and monitoring workforce performance. It provides valuable insights into employee attrition patterns, salary distributions, and job satisfaction levels. Key findings highlight trends in compensation, tenure, and performance metrics, enabling HR professionals to identify areas of concern and opportunities for improvement. The interactive features of the dashboard support data-driven decision-making, making it a reliable tool for enhancing workforce management strategies and improving employee retention.

7.2 Recommendations:

- Implement training programs for departments with high attrition.
- Revise salary packages to improve satisfaction and retention.
- Conduct frequent surveys to measure satisfaction and identify areas of improvement.

7.3 Limitations:

The analysis conducted in this study relies on historical employee data, which provides valuable insights into past trends but may not fully capture future dynamics or external factors that could influence workforce behavior. Factors such as changes in industry standards, economic conditions, or organizational restructuring may not be reflected in the dataset. Additionally, the data may be limited by biases, inaccuracies, or missing information, which could affect the accuracy of some insights. While the dashboard offers a powerful tool for current analysis, its predictive capabilities are constrained by the scope of the data and may not account for emerging trends or unforeseen events that could impact employee attrition and performance.

References:

1. Davenport, T. H. (2013). Competing on Analytics: The New Science of Winning. https://hbr.org/book/competing-on-analytics

2. Fitz-Enz, J. (2000). The ROI of Human Capital: Measuring the Economic Value of Employee Performance. https://www.amazon.com/ROI-Human-Capital-Measuring-Performance/dp/0814406419

3. Harvard Business Review. (2020). HR Analytics: Driving Business Results with Data. https://hbr.org/2020/10/hr-analytics-driving-business-results-with-data

4: Dataset reference: Avishek Chaudhary https://github.com/avishek-choudhary/IBM-HR-Analytics/blob/main/dataset.csv

Appendix A:

SQL Scripts

/*check the missing values */

```
select count(*) as Total_rows,
count(Age)-count(Age) as Missing_Age,
count(BusinessTravel) as Non_missing_Business_travels,
count(*)-count(BusinessTravel) as Missing_Business_travels,
count(Attrition) as non_missing_attritons,
count(*)-count(Attrition) as missing_attritions
from hr_capstone.hr_analytics;
```

/* REmove duplicates based on emp_id */

```
delete t1 from hr_capstone.hr_analytics t1 join(select min(EmpId) as min_id,
EmpID from hr_capstone.hr_analytics
group by EmpID
having count(*)>1)
t2 on t1.EmpId=t2.EmpID where t1.EmpId>t2.EmpID;

set @threshold =2000;
update hr_capstone.hr_analytics
set MonthlyIncome= CASE
when MonthlyIncome>=@threshold
then @threshold else MonthlyIncome end;
```

/* handle outliers in monthly income */

```
set @q1 =round(select MonthlyIncome from hr_capstone.hr_analytics)*0.25);
```

/* add new column tenure group */

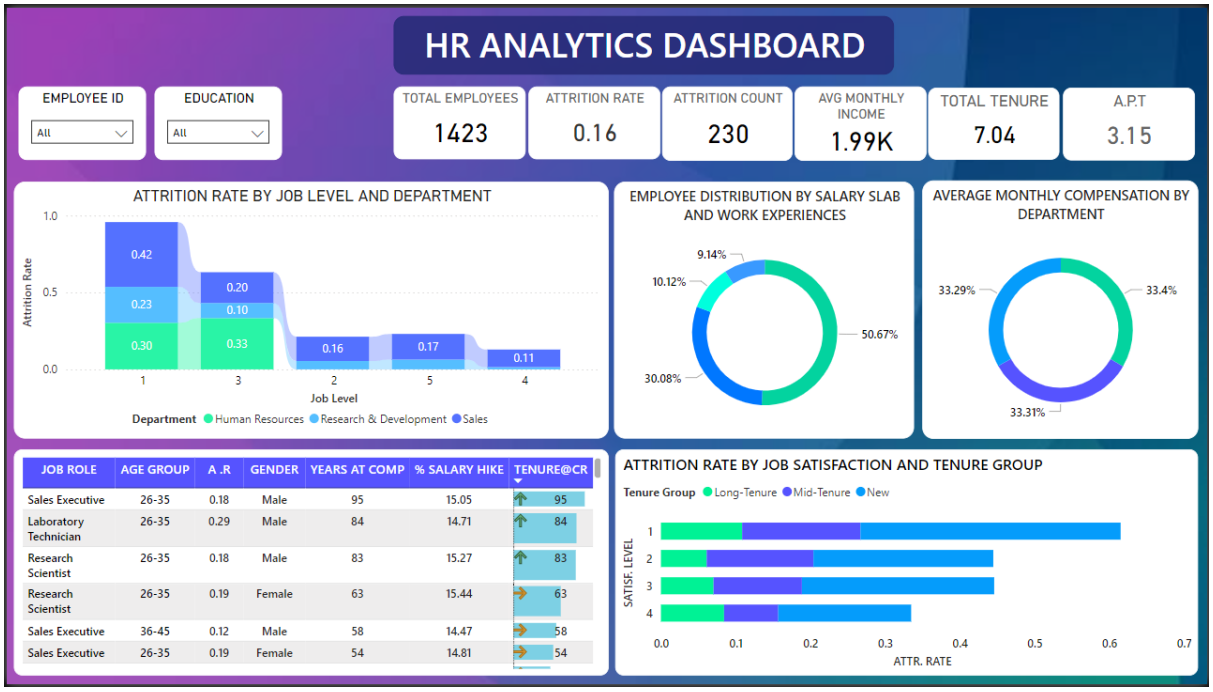
```
alter table hr_capstone.hr_analytics add TenureGroup varchar(20);
 update hr_capstone.hr_analytics
 set TenureGroup=case
 when  YearsAtCompany < 5 then 'New'
 when YearsAtCompany between 5 and 10 then 'Mid-Tenure'
 else 'Long-Tenure'
 end;
```

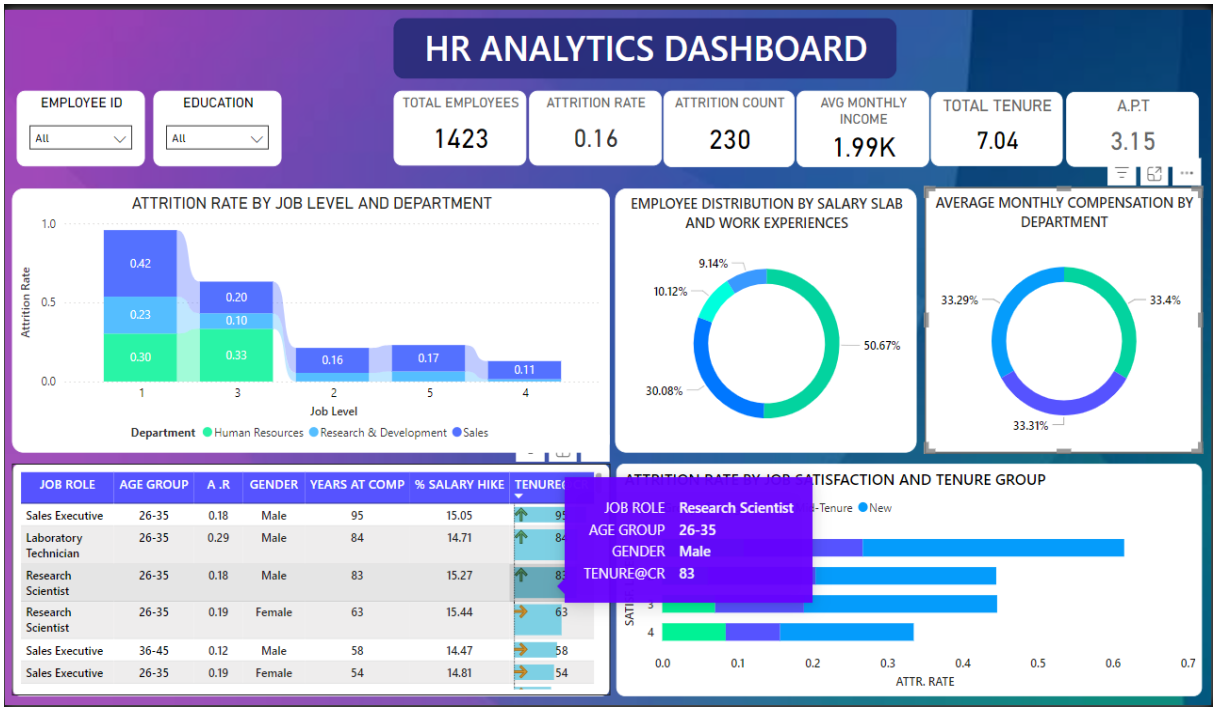
/*calculate the average age and store it in a variable
updat the age coloumn where age is null*/

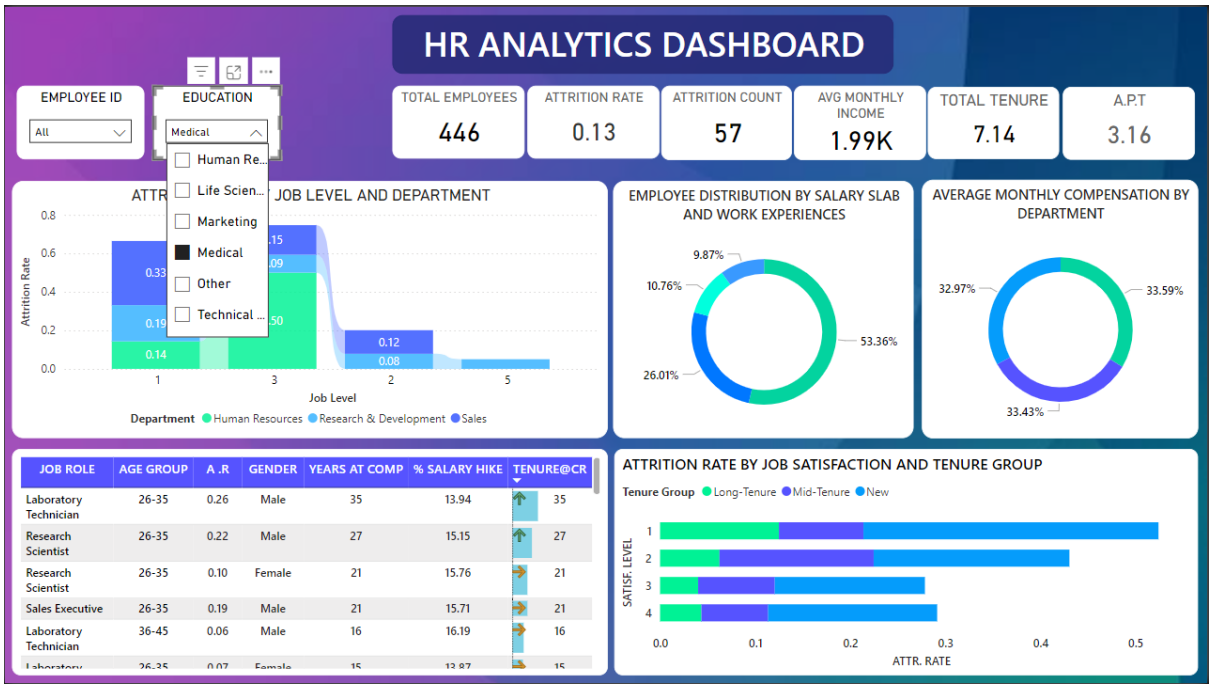
```
set @avg_age =(select avg(Age) from hr_capstone.hr_analytics where age is not null);

update hr_capstone.hr_analytics set Age= @avg_age where Age is null;
```

Appendix B: Dashboard Screenshots.




HR ANALYTICS DASHBOARD
EMPLOYEE ID
All
EDUCATION
All
TOTAL EMPLOYEES
1423
ATTRITION RATE
0.16
ATTRITION COUNT
230
AVG MONTHLY INCOME
1.99K
TOTAL TENURE
7.04
A.P.T
3.15
ATTRITION RATE BY JOB LEVEL AND DEPARTMENT
Attrition Rate
Job Level
Department Human Resources Research & Development Sales
EMPLOYEE DISTRIBUTION BY SALARY SLAB AND WORK EXPERIENCES
9.14%
10.12%
50.67%
30.08%
AVERAGE MONTHLY COMPENSATION BY DEPARTMENT
33.29%
33.4%
33.31%
JOB ROLE AGE GROUP A .R GENDER YEARS AT COMP % SALARY HIKE TENURE(
Sales Executive 26-35 0.18 Male 95 15.05
Laboratory Technician 26-35 0.29 Male 84 14.71
Research Scientist 26-35 0.18 Male 83 15.27
Research Scientist 26-35 0.19 Female 63 15.44
Sales Executive 36-45 0.12 Male 58 14.47
Sales Executive 26-35 0.19 Female 54 14.81
JOB ROLE Research Scientist
AGE GROUP 26-35
GENDER Male
TENURE@CR 83
Tenure New
ATTR. RATE


HR ANALYTICS DASHBOARD
EMPLOYEE ID
All
EDUCATION
Medical
Human Re...
Life Scien...
Marketing
Medical
Other
Technical ...
TOTAL EMPLOYEES
446
ATTRITION RATE
0.13
ATTRITION COUNT
57
AVG MONTHLY INCOME
1.99K
TOTAL TENURE
7.14
A.P.T
3.16
JOB LEVEL AND DEPARTMENT
Attrition Rate
Job Level
Department Human Resources Research & Development Sales
EMPLOYEE DISTRIBUTION BY SALARY SLAB AND WORK EXPERIENCES
9.87%
10.76%
53.36%
26.01%
AVERAGE MONTHLY COMPENSATION BY DEPARTMENT
32.97%
33.59%
33.43%
JOB ROLE AGE GROUP A .R GENDER YEARS AT COMP % SALARY HIKE TENURE@CR
Laboratory Technician 26-35 0.26 Male 35 13.94 35
Research Scientist 26-35 0.22 Male 27 15.15 27
Research Scientist 26-35 0.10 Female 21 15.76 21
Sales Executive 26-35 0.19 Male 21 15.71 21
Laboratory Technician 36-45 0.06 Male 16 16.19 16
ATTRITION RATE BY JOB SATISFACTION AND TENURE GROUP
Tenure Group Long-Tenure Mid-Tenure New
SATISF. LEVEL
ATTR. RATE